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10/633,935	08/04/2003	Ronald E. Malmin	2003P07967 US	5783

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EXAMINER
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HANNAHER, CONSTANTINE

ART UNIT	PAPER NUMBER
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2884

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04/18/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/633,935	<b>Applicant(s)</b> MALMIN, RONALD E.	
	<b>Examiner</b> Constantine Hannaher	<b>Art Unit</b> 2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 11 January 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-15, 18, 19 and 21-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-15, 18, 19 and 21-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION****Drawings**

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the photodetector and surface treatment of claim 11 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

**Claim Rejections - 35 USC § 112**

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 11-15, 18, and 23-25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not describe a gamma camera in which a photodetector is attached at one end of the bar detector, nor one in which a “light collection optimizing surface treatment” is applied to the other end. Accordingly, the claims are not entitled to a filing date earlier than January 11, 2008.

#### **Claim Rejections - 35 USC § 103**

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, 4, 22, 5, 7-10, 21, 11, 13-15, 18, 23-25, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng (US006762413B2) in view of Miraldi (US003688113A).

With respect to independent claim 1, Zeng discloses a gamma camera **22** (Fig. **2A**, column 5, lines 24-55) comprising a plurality of radiation sensitive detector elements **106** (Fig. **4**), at least one solid-state photodetector coupled to the elements **106** (column 7, lines 34-35), and a slat collimator **100** including a plurality of elongated slats **102** for collimating each of the plurality of elements **106** to receive gamma photons (column 1, lines 13-14) in only a single dimension (along dimension **W<sub>y</sub>**). The radiation sensitive detector elements **106** in the gamma camera **22** of Zeng are made of scintillating material (column 7, lines 31-35) and are elongated (dimension **C<sub>y</sub>** of the detector

elements **106** is substantially the same as the dimension  $W_y$  of the slats **102**, column 7, lines 45-48) and thus constitute a “bar” within the meaning of the claim, arranged in a stack configuration (Fig. 4). Zeng leaves the specific arrangement of the optical communication of the appropriate photodetector to the stack of elongated bar detector strips **106** as a choice within the ordinary skill in the art (column 7, lines 34-35) since no explicit description or illustration of such optical communication is included. There are only six sides, however, to a parallelepiped bar as shown by Zeng at **106** (or to a stack thereof) and those of ordinary skill in the art recognize that there is no opportunity to couple a photodetector to the incident radiation side of the stack (because this would attenuate the radiation traveling towards the scintillator) or to the sides of the strips facing the collimator slats (because this would increase the slat spacing  $G$  and reduce the resolution). Miraldi discloses a gamma camera **12** (column 4, lines 1-2) comprising a plurality of scintillation crystals **86** (column 5, lines 15-19) with the recited aspect ratio (FIG. 6, column 5, line 63), at least one photodetector **96, 98** coupled by a physical attachment as is apparent in the view to at least one end of each crystal **86** normal to its elongated dimension (Fig. 7), and a collimator **88** with a plurality of channels **94** for collimating each of the plurality of crystals **86** to receive gamma photons in only a single dimension. Thus Miraldi shows (Fig. 7) that optical communication between an elongated bar detector strip made of scintillating material **86** and a photodetector **96, 98** in a gamma camera by physical attachment of the photodetector to an end of the bar detector strip (and thus normal to the elongated dimension) has long been known. In view of the good light collection from a long bar strip with end-attached photodetectors (with reflective coating **92** as disclosed by Miraldi to guide light to the ends, column 6, lines 2-5) and the explicit teaching of aspect ratio where Zeng is silent, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the gamma camera of Zeng to specify that the photodetectors in the gamma camera **22** were

of the recited aspect ratio and physically attached to at least one end of the stack of elongated bar detector strips **106**.

With respect to dependent claim 2, Zeng discloses that each elongated bar detector strip **106** is in optical communication with an appropriate photodetector (column 7, lines 31-35). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made, in view of the suggestion of Miraldi, to modify the gamma camera **22** of Zeng to further comprise a plurality of photodetectors each physically attached to at least one end of each elongated bar detector strip **106** of the stack.

With respect to dependent claim 4, Zeng discloses that the photodetectors are photodiodes (column 7, line 35).

With respect to dependent claim 22, Miraldi suggests photodetectors **96, 98** are physically attached to both ends of the scintillation crystal **86**. It would have been obvious to one of ordinary skill in the art at the time the invention was made to physically attach each of the elongated bar detector strips **106** in the stack of the gamma camera **22** of Zeng to a photodetector at both ends as suggested by Miraldi in order to avoid an artifact based on distance of the scintillation event from the one photodetector.

With respect to dependent claim 5, Zeng discloses that the elongated bar detector strips **106** are formed of CsI (column 7, line 34).

With respect to dependent claim 7, Zeng discloses each elongated bar detector strip **106** is located between individual slats **102** of the slat collimator **100** (column 7, lines 23-26).

With respect to dependent claim 8, each of the individual slats **102** in the gamma camera **22** of Zeng has a length  $W_y$  matching the length  $C_y$  of the elongated bar detector strips **106** (column 7, lines 45-48).

With respect to dependent claim 9, the slat collimator **100** in the gamma camera **22** of Zeng is mounted adjacent to the plurality of elongated bar detector strips **106** (Fig. 4).

With respect to dependent claim 10, see the explanation of the rejection against claim 8, and further the spacing **G** between slats **102** of the slat collimator **100** in the gamma camera **22** of Zeng (Fig. 4) matches the dimension  $C_x$  of the elongated bar detector strips **106** (compare with Fig. 8 where every other slat **102** is omitted and  $2C_x=2G$ ).

With respect to dependent claim 21, Miraldi suggests photodetectors **96, 98** are physically attached to both ends of the scintillation crystal **86**. It would have been obvious to one of ordinary skill in the art at the time the invention was made to physically attach the stack of elongated bar detector strips **106** in the gamma camera **22** of Zeng to at least a second photodetector at a second end of the stack as suggested by Miraldi in order to avoid an artifact based on distance of the scintillation event from the one photodetector.

With respect to independent claim 11, Zeng discloses a gamma camera **22** (Fig. **2A**, column 5, lines 24-55) comprising a plurality of radiation sensitive detector elements **106** (Fig. 4), at least one photodetector coupled to the elements **106** (column 7, lines 34-35), and a slat collimator **100** including a plurality of elongated slats **102** for collimating each of the plurality of elements **106** to receive gamma photons (column 1, lines 13-14) in only a single dimension (along dimension  $W_y$ ). The radiation sensitive detector elements **106** in the gamma camera **22** of Zeng are made of scintillating material (column 7, lines 31-35) and are elongated (dimension  $C_y$  of the detector elements **106** is substantially the same as the dimension  $W_y$  of the slats **102**, column 7, lines 45-48) and thus constitute a “bar” within the meaning of the claim (Fig. 4). Zeng leaves the specific arrangement of the optical communication of the appropriate photodetector to the stack of elongated bar detector strips **106** as a choice within the ordinary skill in the art (column 7, lines

34-35) since no explicit description or illustration of such optical communication is included. There are only six sides, however, to a parallelepiped bar as shown by Zeng at **106** (or to a stack thereof) and those of ordinary skill in the art recognize that there is no opportunity to couple a photodetector to the incident radiation side of the stack (because this would attenuate the radiation traveling towards the scintillator) or to the sides of the strips facing the collimator slats (because this would increase the slat spacing **G** and reduce the resolution). Miraldi discloses a gamma camera **12** (column 4, lines 1-2) comprising a plurality of scintillation crystals **86** (column 5, lines 15-19), at least one photodetector **96, 98** coupled to at least one end of each crystal **86** normal to its elongated dimension (Fig. 7), and a collimator **88** with a plurality of channels **94** for collimating each of the plurality of crystals **86** to receive gamma photons in only a single dimension. Thus Miraldi shows (Fig. 7) that optical communication between an elongated bar detector strip made of scintillating material **86** and a photodetector **96, 98** in a gamma camera by physical attachment of the photodetector to an end of the bar detector strip (and thus normal to the elongated dimension) has long been known. In view of the good light collection from a long bar strip with end-attached photodetectors (with reflective coating **92** as disclosed by Miraldi to guide light to the ends, column 6, lines 2-5), it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the gamma camera of Zeng to specify that the photodetectors in the gamma camera **22** were physically attached to at least one end of the stack of elongated bar detector strips **106**. The Examiner takes official notice without documentary evidence that it is demonstrable in the art of gamma detection using a bar of scintillator material that the expedients of a detector at each end of the bar and a detector at one end of the bar with a treatment within the scope recited (*e.g.*, mirror finish, reflecting material coating, *etc.*) are known as equivalents for the same purpose. Since it requires no motivation to replace one art-recognized equivalent for another, it would have been



obvious to one of ordinary skill in the art at the time the invention was made to modify the gamma camera suggested by Zeng and Miraldi to replace the two photodetectors with a single photodetector and surface treatment.

With respect to dependent claim 13, Zeng discloses that the photodetectors are photodiodes.

With respect to dependent claim 14, Zeng discloses that the elongated bar detector strips **106** are formed of CsI (column 7, line 34).

With respect to dependent claim 15, Zeng discloses each elongated bar detector strip **106** is located between individual slats **102** of the slat collimator **100** (column 7, lines 23-26).

With respect to dependent claim 18, each of the individual slats **102** in the gamma camera **22** of Zeng has a length  $W_y$  matching the length  $C_y$  of the elongated bar detector strips **106** (column 7, lines 45-48).

With respect to dependent claim 23, the slat collimator **100** in the gamma camera **22** of Zeng is mounted adjacent to the plurality of elongated bar detector strips **106** (Fig. 4).

With respect to dependent claim 24, see the explanation of the rejection against claim 18, and further the spacing  $G$  between slats **102** of the slat collimator **100** in the gamma camera **22** of Zeng (Fig. 4) matches the dimension  $C_x$  of the elongated bar detector strips **106** (compare with Fig. 8 where every other slat **102** is omitted and  $2C_x=2G$ ).

With respect to dependent claim 25, Miraldi suggests photodetectors **96, 98** are physically attached to both ends of the scintillation crystal **86**. It would have been obvious to one of ordinary skill in the art at the time the invention was made to physically attach each of the elongated bar detector strips **106** in the gamma camera **22** of Zeng to a photodetector at both ends as suggested by Miraldi in order to avoid an artifact based on distance of the scintillation event from the one photodetector.

With respect to independent claim 19, Zeng discloses a method of obtaining tomographic images (column 1, lines 12-13) of an object **200** (Fig. 6) corresponding to the illustrated gamma camera **B** (Fig. 1) which would comprise the steps of obtaining a plurality of sets of planar integral scintillation event data from the object **200** at a plurality of azimuth angles (column 8, lines 23-34) of a rotating scintillation detector (*e.g.*, Fig. 4 and column 7, lines 31-35) for each of a plurality of gantry angles of a gamma camera **22** (column 8, lines 6-21) and reconstructing the plurality of sets of planar integral scintillation event data to form a tomographic image of the object **200** (column 8, lines 43-56). The radiation sensitive detector elements **106** in the gamma camera **22** of Zeng are made of scintillating material (column 7, lines 31-35) and are elongated (dimension  $C_y$  of the detector elements **106** is substantially the same as the dimension  $W_y$  of the slats **102**, column 7, lines 45-48) and thus constitute a “bar” within the meaning of the claim (Fig. 4). The gamma camera **22** of Zeng further comprises at least one photodetector coupled to each elongated bar detector strip **106** (column 7, lines 34-35) and a slat collimator **100** including a plurality of elongated slats **102** for collimating each of the plurality of elongated bar detector strips **106** to receive gamma photons (column 1, lines 13-14) in only a single dimension (along dimension  $W_y$ ). Zeng leaves the specific arrangement of the optical communication of the appropriate photodetector to the stack of elongated bar detector strips **106** as a choice within the ordinary skill in the art (column 7, lines 34-35) since no explicit description or illustration of such optical communication is included. There are only six sides, however, to a parallelepiped bar as shown by Zeng at **106** (or to a stack thereof) and those of ordinary skill in the art recognize that there is no opportunity to couple a photodetector to the incident radiation side of the stack (because this would attenuate the radiation traveling towards the scintillator) or to the sides of the strips facing the collimator slats (because this would increase the slat spacing  $G$  and reduce the resolution). Miraldi discloses a gamma camera **12**

(column 4, lines 1-2) comprising a plurality of scintillation crystals **86** (column 5, lines 15-19) with the recited aspect ratio (FIG. 6, column 5, line 63), at least one photodetector **96, 98** physically attached to at least one end of each crystal **86** normal to its elongated dimension (Fig. 7), and a collimator **88** with a plurality of channels **94** for collimating each of the plurality of crystals **86** to receive gamma photons in only a single dimension. Thus Miraldi shows (Fig. 7) that optical communication between an elongated bar detector strip made of scintillating material **86** and a photodetector **96, 98** in a gamma camera by physical attachment of the photodetector to an end of the bar detector strip (and thus normal to the elongated dimension) has long been known. In view of the good light collection from a long bar strip with end-coupled photodetectors (with reflective coating **92** as disclosed by Miraldi to guide light to the ends, column 6, lines 2-5) and the explicit teaching of aspect ratio where Zeng is silent, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Zeng to specify that the photodetectors in the gamma camera **22** were of the recited aspect ratio and physically attached to at least one end of the elongated bar detector strips **106**.

6. Claims 3 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng (US006762413B2) and Miraldi (US003688113A) as applied to claims 2 and 11 above, and further in view of Iwanczyk *et al.* (US006521894B1).

With respect to dependent claims 3 and 12, the photodetectors in the gamma camera suggested by Zeng and Miraldi are “appropriate” (column 7, line 35). Iwanczyk *et al.* discloses that silicon drift detectors **11** (Fig. 1) are an appropriate photodetector for coupling to a scintillator **37** in a gamma detector **10**, especially to a CsI scintillator **53** (Fig. 4B) shaped as a rod. In view of the effective performance of silicon drift detectors in coupling to an elongated scintillation element as described by Iwanczyk *et al.*, it would have been obvious to one of ordinary skill in the art at the time

the invention was made to modify the gamma camera **22** suggested by Zeng and Miraldi to specify that the appropriate photodetectors physically attached to the stack of elongated bar detector strips **106** (or to the strips themselves) was of the silicon drift detector type.

**Response to Submission(s)**

7. The amendment filed January 11, 2008 has been entered. The action mailed October 11, 2007 was premature in view of the failure of the reply of August 14, 2007 to correctly list claim 20. Accordingly, the Examiner notes the delay in replying to the notice of non-compliance mailed the same day of two months past the period for reply set in the notice.

8. Applicant's arguments filed January 11, 2008 have been fully considered but they are not persuasive.

The application "as published" is not a part of the written record in the Office under 37 CFR 1.2 so references to it are useless. Furthermore, the test under 35 U.S.C. 112, first paragraph for entitlement to a filing date is what was taught by the disclosure as filed.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The amendments to claims 1 and 19 recite a feature already shown by a reference.

To adequately traverse a finding of official notice, a demand for documentary evidence is inadequate. The applicant must specifically point out the supposed errors in the examiner's action, which would include stating why the noticed fact is not considered to be common knowledge or well-known in the art.

The remarks of applicant's representative do not overcome the deficiency noted by the Board at page 9 of its Decision.

For at least the reasons explained above, Applicant is not entitled to a favorable determination of patentability in view of the arguments submitted January 11, 2008.

#### **Conclusion**

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Constantine Hannaher whose telephone number is (571) 272-2437. The examiner can normally be reached on Monday-Friday with flexible hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**/Constantine Hannaher/  
Primary Examiner, Art Unit 2884**